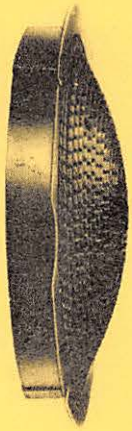
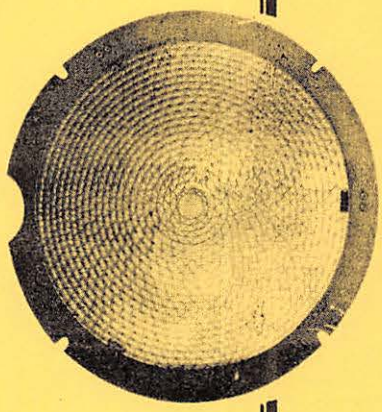
P. F. Hillard





"PHANKILL" UNIT

For Highway Crossing Flashing Light Signals

(Eliminates Phantom)

-◆-

U. D. 227

Union Switch & Signal Co.

Swissvale, Pa.

Not to be used unless so specified by R R Co. Per W B Mills PF 7-24

Union Switch & Signal Co.

SWISSVALE, PA.

Subject "Phankill" Units for Highway Crossing Flashing Light Signals	Union Development
	Number 227
	Date February 22, 1937
	3 Sheets

In early developments for flashing light signals the doublet lens optical system with its lower intensity of indication was acceptable as a signal practically free from phantom. Reflector type signals were later developed, and have been universally accepted because of the brighter indications that were possible as compared to the doublet lens.

Modern flashing light highway crossing signals using a reflector type optical system to give a maximum intensity of indication have been recognized as subject to a certain amount of phantom indication by reflected external light. All objections to this were practically withdrawn on the basis of the indication being on the safe side, namely; a steady red light, and that when the lights were flashing due to the approach of a train the flashing would be apparent in spite of the phantom.

Recently, however, there have been some situations where the reflection due to sunlight can be so pronounced that the observer is unable to distinguish a flashing indication, and we have developed a means to correct for it and still retain the strong intensity of the modern signal that is not possible with doublet lens signals. This is done with a Phankill screen that is readily applicable to

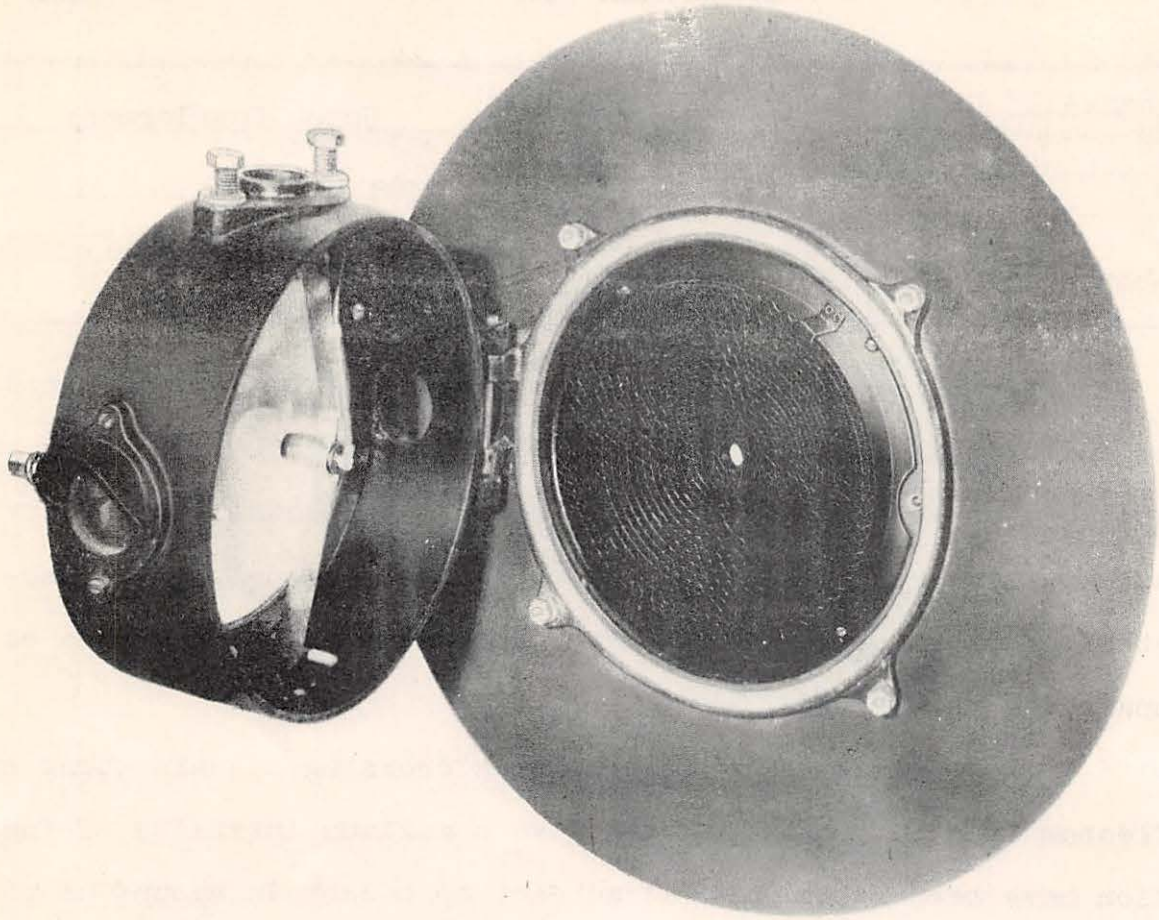


Fig. 1.....Application of "Phankill" Screen to Style HC-81 Highway Crossing Color Light Signal Lamp Unit

existing signals or may be supplied with new ones when specified.

Construction:

Figure 1 shows the application of the "Phankill" screen to a Style HC-81 Lamp Unit. The screen is made of two thin copper strips (one plain and one corrugated), wound together into a spiral and formed to conform with the shape of the cover glass. This construction presents innumerable cells, the walls of which are parallel with the axis of the lamp unit, thus causing only a slight reduction in the parallel beam from the signal. Three clips fasten

the cellular screen to a mounting ring which has four punched holes conforming with the spacing of the screws used to secure the cover glass to the door casting.

The complete Phankill unit is made of copper and is oxidized and lacquered to present a smooth, thin, dull black finish.

Application:

The "Phankill" Unit as at present designed is applicable to Style HC-81, and the front light of Style HC-8 lamp units. It can be added to existing lamp units of these types by inserting it in place of the four clips used to secure the cover glass to the door casting. It can be made for application to Style HC-5 lamp units if necessary.

Ordering References:

To order a Phankill unit for inserting in an existing Style HC-81 Highway Color Light Signal or for the front light of a Style HC-8 Signal, specify;

Pc. 207075 "Phankill unit complete"---------Dwg. C9482-Sh.7

To secure Phantom protection in new Highway Crossing Color Light Signal assemblies, specify the desired Catalog reference from Plate K-158 or K-159 and mention "with Phankill Unit."

H. H. Cadwallader 7-23-37

Vice Pres. & Gen'l Mgr.

P.F.W.

FN-16 Relays
Change in Orders to
Supply FN-16A

Swissvale, Pa., July 11, 1947

NEW YORK OFFICE
CHICAGO OFFICE
ST. LOUIS OFFICE
SAN FRANCISCO OFFICE
MR. J. K. MICKLEY

In accordance with our (AED) letter of July 1, on the above subject, we are attaching a list of the orders from customers in your territory in which FN-16A relays will be substituted for FN-16 relays.

W W Baughman, Jr.

AED:lk

NEW YORK

G.O.	Railroad	Quantity	FN-16 Pc.	TO	FN-16A Pc.
38826	N.Y.O.&W.	1	104134		265738
38827	N.Y.O.&W.	1	"		"
39100	W. Ry. of A.	1	"		"
39101	W. Ry. of A.	1	"		"
39613	C. & O.	1	"		"
39658	D. L. & W.	1	"		"
39659	D. L. & W.	1	"		"
36736	Clinchfield	1	"		"
40183	D. L. & W.	16	"		"
39388	C. R.R. of Pa.	1	"		"
39679	C. & O.	2	"		"
41172	W. Md.	8	"		"
41206	C. & O.	1	"		"
42553	C. & O.	5	"		"
42563	A.C.L.	1	"		"
42820	Can. Nat.	1	"		"
41249	S.A.L.	10	104135		265739

AED:lk

7/11/47

Chicago Office:

G.O.	R.R.	Quantity	FN-16 Pc. 104134	to	FN-16A Pc. 265738
37600-3	Illinois Central	1	"		"
37600	Illinois Central	1	"		"
38825-1	C. R. T.	1	"		"
39351	A. T. & S. F.	12	"		"
40082	C. R. I. & P.	2	"		"
40105	C. M. St. P. & P.	1	"		"
40103	C. M. St. P. & P.	1	"		"
40404	Illinois Central	6	"		"
40312	M. & St. L.	2	"		"
40341	C. B. & Q.	7	"		"
40405	Illinois Central	2	"		"
40749	Union Pacific	1	"		"
41048	C. B. & Q.	4	"		"
40491	C. M. St. P. & P.	1	"		"
41363	Illinois Central	1	"		"
41820	C. R. I. & P.	1	"		"
41000	Union Pacific	1	"		"
41600	A. T. & S. F.	20	"		"
42043	Union Pacific	1	"		"
41351	A. T. & S. F.	2	"		"
42807	Wichita Valley	2	"		"
42890	A. T. & S. F.	2	"		"
42852	A. T. & S. F.	2	"		"
43062	Illinois Central	2	"		"
37938	Union Pacific	1	104135		265739
38753	Union Pacific	1	"		"

AED:mmk 7-11-42

St. Louis:

G.O.	R.R.	Quantity	FN-16 to Pc. 104134	FN-16A Pc. 265738
38214	St. L. S. F.	1	"	"
38918	St. L. S. F.	1	"	"
38748	Wabash	15	"	"
40951	St. L. S. F.	1	"	"
42497	St. L. S. F.	1	"	"
42544	St. L. S. F.	1	"	"
42687	T. & N. O.	1	"	"

AED:mmk
7/11/47

J. K. M.

G.O.	Railroad	Quantity	FN-16 Pc.	TO	FN-16A Pc.
37200	Car. Ill. Steel	1	104134		265738
39929	W. & L.E.	2	"		"
41209	G. T. W.	48	"		"
41255	W. & L.E.	1	"		"
41509-1	D. T. & I.	1	"		"
39745	Trailmobile Co.	1	"		"
41826	D. T. & I.	1	"		"
36000	W. & L.E.	2	"		"
38852	N.Y.C. & St.L.	1	104135		265739
42535	P. M.	1	"		"

AED:lk

7/11/47

San Francisco Office:

No orders in your territory.

AED:mmk
7-11-47

C.W.B.

FN-16 Relays
Change in Orders to
Supply FN-16A

Swissvale, Pa., July 1, 1947

NEW YORK OFFICE:
CHICAGO OFFICE:
ST. LOUIS OFFICE:
SAN FRANCISCO OFFICE:
MR. J. K. MICKLEY:

We are attaching your copy of Engineering Letter #9 covering the FN-16A flasher relay.

In the near future we will send you a list covering the railroads that you handle showing the orders on hand calling for FN-16 relays on which FN-16A relays will be substituted. This will permit you to notify the railroads of the change. We are assuming there can be no objections to the substitution but do suggest that the railroads be given advance information and be requested to change their ordering information for the future.

G W Baughman

AED:lk

Engr. Letter #9
FN-16A Flasher Relay

Swissvale, Pa., July 1, 1947

NEW YORK OFFICE:
CHICAGO OFFICE:
ST. LOUIS OFFICE:
SAN FRANCISCO OFFICE:
MR. J. K. MICKLEY:

We have just completed a redesign of our FN-16 flasher relay. The new relay is known as the FN-16A flasher relay and offers improved contact life, particularly when lamps are operated from D.C.

The change in the relay involves a change in the structure of the lamp contacts, in the armature counterweight, and in the design of the armature supporting bracket. The armature supporting bracket has been redesigned to allow the armature to be removed or installed with armature springs in place. The top plate, magnetic circuit and other details have not been changed. An exceptionally large contact transfer opening has been provided.

The metal to metal lamp contacts using special silver alloys that have been furnished on the FN-16 relay since 1938 have given very long and satisfactory contact life in the usual highway crossing service in which the lamps are normally operated from A.C. power with D.C. battery used for reserve. However, a few cases have come to our attention in which the lamps are operated from D.C. at all times, which resulted in the FN-16 lamp contacts giving a decreased length of service.

The fact that the contact life of the FN-16 relay was poorer in D.C. service than in A.C. service was recognized from the first, but since D.C. operation was not widely used and where used the lamp loads were usually small, and since exceptional contact life was provided in the normal case where A.C. is used for the lamps, the metal to metal type contacts were considered desirable. There has since been a trend on the part of some users to operate the lamps from D.C. at all times, and need for improved performance in this service became apparent.

A transfer of contact material from one contact member to the other mating member is always observed in D.C. service. This

cannot be avoided, but proper choice of materials will reduce material transfer. The metals used on the FN-16 flasher relay lamp contacts had been carefully selected to give minimum material transfer consistent with other desirable properties. These contact materials have been retained in the FN-16A flasher relay.

The FN-16A relay lamp contacts differ from those used on the FN-16 relay principally in the mechanical design of the contact parts. In the attached sketch, Fig.1 shows the lamp contacts of the FN-16A relay while Fig.2 shows the lamp contacts used on the FN-16 relay. On the FN-16A relay the bridging opening between normal and reverse contacts has been considerably increased. This increases the amount of material transfer that can be tolerated. At the same time the amount of contact slide has been reduced and the mechanical design of the contact parts has been worked out so that locking action between contact members after the contacts have become roughened is less likely to occur and could not result in a reduction of the bridging opening.

As a result of the above changes the long and trouble free contact life on A.C. that has characterized the FN-16 relay has been fully retained in the FN-16A relay, and can now be claimed for D.C. also. A life of 20 million operations at 5 amps. per contact can be expected on either A.C. or D.C. low voltage power. This provides 8 years service on a busy crossing operating three hours per day.

It is important to note that transfer of contact material will still occur with the FN-16A relay when lamps are operated on D.C. However, the mechanical design of the contacts is such that shunt control of lamps can now be safely used with no danger of material transfer causing the contacts to bridge across. Shunt control of lamps gives longer contact life than make and break control.

FN-16 flasher relays now in service can be modified to have the new design lamp contacts used on the FN-16A flasher relay. The only change required other than the change in the lamp contacts themselves is a change in the armature counterweight. While new FN-16A relays will be provided with a new armature supporting bracket, this change is only for convenience in assembly and repairs and is entirely independent of contact design improvements. We are listing below the references for materials required to install the FN-16A type lamp contacts on 2N-2R and 4N-4R FN-16 flasher relays. New armature counterweights are included; but new armature supporting brackets are omitted.

S.B.M.268994 - Material for installing FN-16A type lamp contacts on 2N-2R FN-16 relay.

S.B.M.268993 - Material for installing FN-16A type lamp contacts on 4N-4R FN-16 relay.

It is our recommendation that FN-16 relays that are used exclusively with D.C. on their lamp contacts be modified to use the FN-16A type lamp contacts. For FN-16 relays that are used normally on A.C. with D.C. used for reserve, we do not consider installation of the FN-16A type contacts to be necessary.

We will make the first shipments of FN-16A relays early this month.

Listed below are the references for FN-16 and FN-16A relays. The FN-16A relay will be furnished in place of the FN-16 relay in accordance with this list.

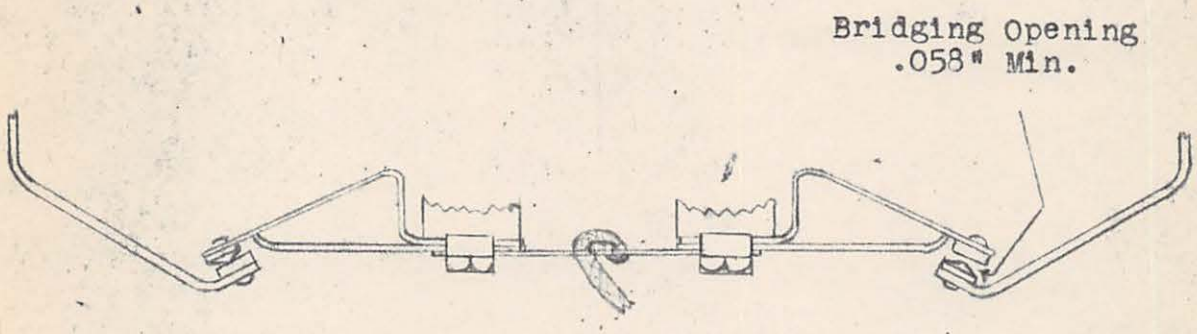
Description		FN-16 Dwg.C9357		FN-16A Dwg.C9357	
Contacts	Res.(Ohms)	Pc.	Sh.	Pc.	Sh.
2N-2R	500 - 500	104138	7	265889	11
"	200 - 200	104139	7	265890	11
"	4.5 - 4.5	104140	7	265891	11
4N-4R	500 - 500	104134	6	265738	9
"	200 - 200	104135	6	265739	9
"	4.5 - 4.5	104136	6	265740	9

U.D.#228 covering the FN-16 relay will be revised to cover the FN-16A relay.

A E Baughman

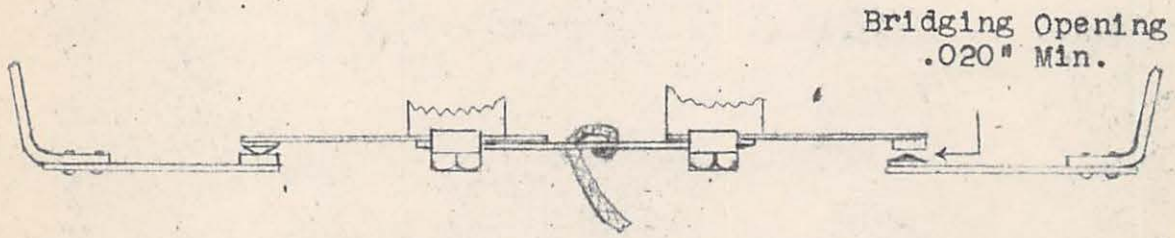
AED:lk

Engr. Letter #9
July 1, 1947



FN-16A Lamp Contact

Fig. 1



FN-16 Lamp Contact

Fig. 2

Union Switch & Signal Co.
AED 7/1/47

Swissvale, Pa.